THURSDAY, AUGUST 14, 1902.

## THE ENCYCLOPÆDIA BRITANNICA.

*The Encyclopædia Britannica.* The Third of the New Volumes, being vol. xxvii. of the Complete Work. Chi–Eld. Pp. xx + 744. (London: A and C. Black, and *The Times*, 1902.)

IT is impossible within the limits of a short notice to describe even briefly more than a few of the scientific articles in this new volume of the "Encyclopædia Britannica." Many subjects of interest to men of science are dealt with, the following being among the contributions:—Cholera, Dr. A. Shadwell; chronograph, Rev. F. J. Jervis-Smith; biblical chronology, Prof. S. R. Driver and Mr. C. H. Turner; coal, Mr. H. Bauerman; Cœlentera, Dr. G. H. Fowler; colours of animals, Prof. E. B. Poulton, F.R.S.; combinatorial analysis, Major P. A. MacMahon, F.R.S.; comets, Dr. E. S. Holden; compass, Captain E. W. Creak; condensation of gases, Prof. J. D. van der Waals; conduction of heat, Prof. H. L. Callendar, F.R.S.; copper, Dr. J. Douglas; cremation, Sir Henry Thompson, Bart.; Crustacea, Rev. T. R. R. Stebbing, F.R.S.; Ctenophora, Dr. G. H. Fowler; cuttlefish, Rev. J. F. Blake; cytology, Mr. Harold W. T. Wager; dairy, Dr. W. Fream; Darwin, Prof. E. B. Poulton, F.R.S.; dietetics, Dr. W. O. Atwater; differential equations, Mr. H. F. Baker, F.R.S.; diffraction gratings, the late Prof. H. A. Rowland; diffusion of gases, Prof. G. H. Bryan, F.R.S.; dimensions of units, Dr. J. Larmor, F.R.S.; diphtheria, Dr. A. Shadwell; du Bois-Reymond, Sir Michael Foster, K.C.B., F.R.S.; dyeing, Prof. J. J. Hummel; dynamo, Mr. C. C. Hawkins; analytical dynamics, Prof. Horace Lamb, F.R.S.; dynamometer, Prof. W. E. Dalby; figure of the earth, M. R. Radau; earthquakes, Prof. J. Milne, F.R.S.; Echinodermata, Dr. F. A. Bather; Echiuroidea, Mr. A. E. Shipley; eclipse, Prof. Simon Newcomb; economic entomology, Prof. F. V. Theobald; education, Sir Joshua Fitch and Dr. N. M. Butler; eel, Mr. J. T. Cunningham; Egypt (physical geography), Major H. G. Lyons; and Egyptology, Prof. W. M. Flinders Petrie, F.R.S., and Mr. F. Ll. Griffith; and elastic systems, Prof. A. E. H. Love, F.R.S.

It will be evident from this selected list of subjects and authors that science is well represented in the volume, and that the editors have endeavoured to secure authoritative statements of the position of knowledge of many departments of scientific study. In general, the articles contain good accounts of advances in the departments of intellectual activity with which the writers deal, but there are some in which the view described is not so comprehensive as it might have been.

Take, for instance, the article on eclipse, which is supposed to bring the information up to the present position of knowledge of the subject as regards eclipses of the sun. We find various details referring to the extent and structure of the corona, and the number of lines photographed during various eclipses, but there is no clear view of the subject as a whole. Significant observations are overlooked, while others are catalogued without any attempt at analysis of the material. The article on comets is just as unsatisfactory, and the only value it has to a student of the subject lies in the catalogues of elements of these bodies. Nothing is said about such important points as the distribution of orbits, the origin of comets or their spectroscopic history.

The article on education, by Sir J. G. Fitch, is worthy of the "Encyclopædia." Its main purpose is

> "to trace the gradual growth of what may be called the English system, the forces which have controlled it, and the results it effected during the last quarter of the nineteenth century."

For purposes of comparison, a brief account is also given of the provision made for education in three or four nations of Europe in which the people are less hampered by tradition and the leaders are animated by a progressive spirit. Towards the close of his valuable paper, Sir Joshua Fitch points out some of the problems of the future.

> "The motive force which we need," he remarks, "must be found in a higher and truer popular conception of a liberal education, and of its relation to the formation of character and to the duties of industrial, civic and family life. That the acquisition of knowledge, though obviously the prominent business of a school, is not the whole of education, and that knowledge consciously directed to the special professional and industrial needs of life is of far less real value than the knowledge which helps to bring out the best powers of the reflective and accomplished man, are truths which are yet imperfectly recognised."

The scientific study of Egyptian antiquities is reviewed in the article "Egyptology" by Prof. W. M. Flinders Petrie and Mr. F. Ll. Griffith. The latter confines his attention to the ancient language.

Egyptology is a science in the making, and as yet no general scientific systems of Egyptian archæological or linguistic study which command the allegiance of all Egyptologists have been worked out, although in the archæological field great progress has been made in this direction, owing chiefly to the work of Prof. Petrie. Any general article dealing with Egyptological study must, therefore, be in great measure a statement of personal opinion on the subject. So in these two articles by Messrs. Petrie and Griffith we have not so much general reviews of Egyptian archæological and linguistic study as *ex-cathedrâ* statements of the opinions held by two distinguished Egyptologists. These, however, are stated without any hint being given to the reader that many other equally distinguished Egyptologists disagree with them. For instance, Prof. Petrie's whole reconstruction of the first two Egyptian dynasties, based on the results of his excavations at Abydos, has recently been challenged in almost every point by Prof. Naville, the distinguished Egyptologist of Geneva, in the *Recueil de Travaux.*

Now we do not think that the Genevan professor's challenge is by any means altogether successful, but the fact that it could be made at all is a proof of the uncertainty of the whole matter. But no hint of uncertainty is given by Prof. Petrie on pp. 720, 722 of the "Encyclopædia" where he deals with it.[1] Similarly, the description of the language given by Mr. Griffith on pp. 726–731, while it contains much matter on which all scholars are agreed, and have been agreed since the time of De Rougé, nay, since the time of Champollion, is, in the main, as he himself makes quite clear, a statement of the views of a particular school of German Egyptologists, led by Dr. Erman, to which Mr. Griffith has attached himself.

---

[1] Prof. Petrie's article was no doubt already set up in type before the publication of that of Prof. Naville, but this makes no difference to the argument; the uncertainty existed from the first.

Now, leaving English Egyptologists out of account, we find that these views are more or less shared by Prof. Sethe, Prof. Steindorff, Prof. Spiegelberg, Prof. Breasted, Dr. Schäfer, and a few others of less note. They are not only not shared, but are constantly criticised, by Prof. Maspero, Prof. Naville and Prof. Piehl, while Profs. Wiedemann, Lieblein and Schiaparelli, MM. Revillout, Lefébure and others, have not shown the slightest disposition to accept them. In England, Prof. Petrie himself has, so far as we are aware, never yet signified his adhesion to the views which Mr. Griffith expounds. Certainly Prof. Petrie never uses the hideous transliteration of the hieroglyphs, without conventional vowels, which is the shibboleth of the Berlin school. Mr. Griffith does, and he is justified in using it in scientific work, but we regret his use of it in a popular encyclopædia, for no person ignorant of the hieroglyphs can possibly comprehend it, and words written according to its rules cannot be pronounced without the insertion of the necessary conventional vowels, which might just as well be inserted in print. Mr. Griffith uses a transcription which is intelligible to the layman in the publications of the Egypt Exploration Fund; why not in the "Encyclopædia Britannica"?

Scientific opinion is therefore sharply divided on the subject of the language, and, this being so, we are of opinion that Mr. Griffith should not have stated the Ermanian theory without giving his readers any hint of the existence of this division of opinion.

Prof. Petrie's historical summary is, after the debatable period of the earliest dynasties is passed, naturally no longer so much an exposition of his own personal views, although on one or two points (*e.g.* the date of the Antef kings) he seems to differ from the opinion of the majority nowadays. His section dealing with archæology generally is of great interest and value. Fig. 10, giving the principal types of Egyptian pottery from the early predynastic period to the twenty-sixth dynasty, is very appropriate to an encyclopædia.

The existence of differences of opinion on important matters among Egyptologists in no way points to any condition of chaos in Egyptology; on the contrary, it rather indicates the energy and vigour of the study, to the furtherance of which men like Prof. Naville and Prof. Maspero are, no less than Prof. Erman, Prof. Petrie and Mr. Griffith, devoting the best energies of their lives.

In Prof. Driver's article on "Old Testament Chronology," which is, generally speaking, very learned and comprehensive, we have one fault to find. At the beginning of the chronological table (p. 77), the professor, after giving Ussher's date for the Creation, proceeds in a most absurd manner to give the "probable real date" for the creation of man, which date, he opines, is "indeterminable, but much before 7000 B.C." (!) Why 7000 B.C. in particular? Because, in the column "Events in Contemporary History" (*sic*), given parallel to the Creation, we find under "Babylonia" the statement "7–6000. Temple of Bel at Nippur founded." So that the Creation Week must have been in a year somewhat anterior to the foundation of the Temple of Bel. Indubitably, but surely in the present year of grace this sort of thing is somewhat ridiculous, and worthier of a theological text-book for the use of Boer predikants (who are credited with also believing that the world is flat and that the sun goes round it) than of the "Encyclopædia Britannica!"

The article on "Earthquakes" contains some valuable sections. Within the compass of two and a half pages, we have accounts of most of the best instruments that have been constructed for the registration of earthquakes, whether of near or of very distant origin. These should be read in conjunction with the article on "Seismometers" in the ninth edition, which as yet is far from obsolete. Following the section referred to are paragraphs in which the results obtained from instrumental records are pithily described, those on velocity being an admirable summary of the important work of recent years. The practical applications of seismometry in the regulations to be observed by builders and engineers in earthquake countries will be read with no less interest than profit. These are all subjects on which the writer of the article is a recognised authority. Other branches of the science are treated in less detail. The sections on the origin and on the frequency and periodicity of earthquakes are hardly representative of our present knowledge on these subjects. Nor are there more than bare allusions to seismic sea waves, earthquake sounds and the changes of surface features produced by earthquakes. In particular, we miss a consecutive account of the phenomena of a typical earthquake. The progress of seismology, however, has been so rapid since the issue of the corresponding article in the ninth edition that to treat all branches in their due proportion within the limits of eight pages would be a difficult task and one requiring very extensive reading.

With the exception of the article "Dynamo," by Mr. C. C. Hawkins, the volume does not contain much of special interest to the electrical engineer. The article on the "Compass," by Captain E. W. Creak, is a useful addition to that in the ninth edition, and that on "Copper" contains a brief summary of the growth and importance of the electrolytic refining industry.

Mr. Hawkins's contribution deserves fuller mention, not only on account of its intrinsic merit, but because it fills a gap more keenly felt, since the references to the dynamo in the ninth edition are very meagre. The present article, however, brings the subject quite up to date. It opens with a brief discussion of the general theory of the induction of electric currents and an account of the development of a practical machine from Faraday's revolving copper disc. The different methods of field and armature winding for continuous-current machines and alternators are then considered more in detail, but not too elaborately. A general summary of the leading types of machine and a consideration of the suitability of each for different classes of work are also given. As a whole, the article forms a valuable contribution to the literature of the subject, and, without going into the matter very deeply, gives an interesting survey of the present position of the dynamo from both a theoretical and a practical point of view.

The first of the more important biological articles included in the volume is one on Cœlentera, by Dr. G. H. Fowler, in which it is shown how much our conception of this group has altered since the date of the previous issue. The colours of animals are treated of by Prof. E. B. Poulton, who lays emphasis on the advance of our knowledge with regard to the object of the general coloration of mammals and birds. Crustacea are described by the Rev. T. R. Stebbing, Ctenophora by Dr. Fowler, and cuttlefish by the Rev. J. F. Blake. In the genealogical table accompanying the latter article it is noticeable that Octopus (or rather Polypus) is regarded as the descendant of an ammonite of the Hoplites group, and also that the author accepts the view of one or two German writers as to the homology of the argonaut shell with that of an ammonite. The Echinodermata (called Echinoderma in the table of contents) are elaborately treated by Dr. F. A. Bather, while Mr. A. E. Shipley is responsible for that small marine group known as Echiurids, and, from the presence of segmentation in larval life, sometimes classed as Annelids.

The very important subject of economic insects falls to the lot of Prof. F. V. Theobald, but limitations of space render his article all too short. Recent investigations into the breeding-habits of the eel and the discovery of the real nature of "leptocephali" have enabled Mr. J. T. Cunningham to render the article "Eel" one of especial interest. The only botanical subject is cytology (vegetable), for which Mr. H. W. T. Wager is responsible.

---

## *ASPECTS OF MEDICAL SCIENCE.*

*Pathologie générale et expérimentale. Les Processus généraux.* Par A. Chantemesse and W. W. Podwyssotsky. Pp. xiv + 428; 162 figures. (Paris: G. Naud, 1901.)

*Matière médicale zoologique, Histoire des Drogues d'Origine animale.* Par H. Beauregard, Professeur à l'École supérieure de Pharmacie de Paris. Revisé par M. Coutière, with a preface by M. D'Arsonval. Pp. xxxi + 396; numerous plates and illustrations. (Paris: G. Naud, 1901.) Price fr. 12.

*Chemische und medicinische Untersuchungen. Festschrift zur des sechzigsten Geburtstages von Max Jaffé.* Pp. 472; 7 plates. (Braunschweig: Vieweg u. Sohn, 1901.)

*Das Wirbeltierblut in mikrokristallographischer Hinricht.* Von Dr. med. H. U. Kobert. Mit einem Vorworte von Prof. R. Kobert. Pp. 108; 26 figures. (Stuttgart: Ferdinand Enke, 1901.)

THE first book before us is the first volume of a system of general and experimental pathology. In an academically written preface of ten pages, the authors explain the object of the book, pointing out the extreme value of comparative experimental pathology in elucidating the prime problems of morbid processes in the human subject. In especial the authors cite the work of Pasteur on silkworm parasites, and that also of Metchnikoff on the effects of irritants upon low forms of life. Equally well might the recent researches upon the causation of malaria have found a mention in this connection. M. Chantemesse's Russian collaborator, M. Podwyssotsky, has already published in Russian a general experimental pathology covering similar ground to the volume under consideration. The present work, however, is much more extensive, both with regard to the letterpress and figures, and can in no sense be regarded as a translation from the Russian.

It is impossible in a short review to enter adequately into the subject-matter of so compendious a volume, and little more than a table of contents can be given. More than half the space is devoted to the degenerations, which are treated very fully, each having appended to it a copious, we were going to say appalling, bibliography. These huge lists of papers bearing on the corresponding subject are really the more appalling in that upon glancing through them it at once becomes evident that they are more complete with regard to French and Russian workers than with regard to German and English ones. Judging from them and the text, it appears that the authors are not well acquainted with current English scientific literature, as the number of English authors quoted is very small, and the same cannot be said of the English work done upon the subject in question. Certainly one, and in the reviewer's opinion not the least, of the advantages of the book is that it makes accessible to a cosmopolitan public a mass of Russian work, evidently of great value, which otherwise, on account either of its language or its inaccessibility, might have easily escaped the observation of workers in the field of experimental pathology, to their and their readers' detriment.

Under the degenerations are included goitre and cretinism, the authors giving, concerning these affections, an interesting series of experiments upon the effect of the water of the district upon endemic goitre. Saint Jean de Maurienne is apparently one of the most goitrous districts of France, and the waters here have actually the reputation of producing goitre, and are resorted to with success by certain individuals anxious to avoid compulsory military service. Glycosuria is discussed under glycogenic degeneration. An interesting section is devoted to watery and vacuolar degeneration, which includes a detailed description, with very beautiful illustrations, of the vacuolisation of the cells of the central nervous system under the influence of certain toxins and drugs.

The book throughout is written in a most lucid and attractive style, and in a distinctly philosophical manner. The amount of subject-matter treated is very great, and even subjects having little more than an indirect bearing upon the main theme of the book are exhaustively discussed. Some idea of the extent to which this is done may perhaps be formed in noting that no less than fifty pages are devoted to the subject of heredity, and that under this division of their subject the authors include a lengthy discussion of the views of Weissmann. The subject of argyrosis, or general pigmentation following the administration of silver salts, occupies six pages, and has appended to it a copious bibliography.

The reviewer regrets that the references in the bibliographies are not numbered, even when quoted in the text; reference to any given paper is by this fact